Multi-Mission Operations Center (MMOC)

The MMOC is part of the Engineering Directorate (Code R) at NASA Ames Research Center

Supporting and enabling low-cost mission operations, the MMOC provides the facilities, networks, IT equipment, software and services required for operating spacecraft in flight.

Overview

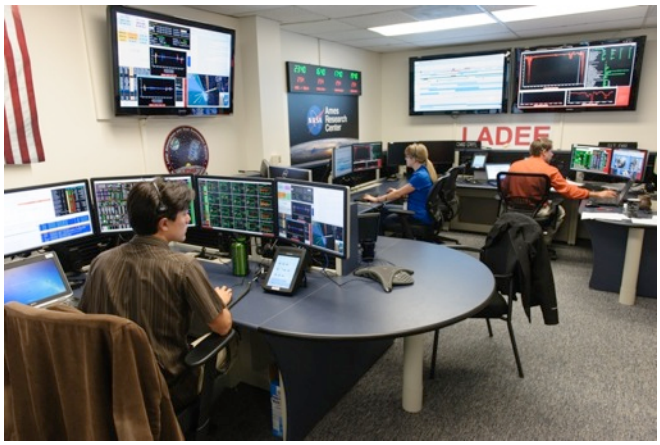
Ames Research Center has successfully designed, built and flown a number of spacecraft, both small and large, dating back to Pioneer in the 1960s. In recent years, Ames has flown Small Spacecraft Missions, such as GeneSat and PharmaSat, as well as full-scale spacecraft, such as LCROSS, Kepler, LADEE and IRIS missions. In addition, it also supports operation of ISS payloads and science instrumentation, such as EMCS and SPHERES.

The Multi-Mission Operations Center (MMOC) enables and supports flight and science operations for Ames spaceflight missions. The MMOC is composed of the facilities, networks, IT equipment, software, and support services needed by flight projects to effectively and efficiently perform all mission functions, including planning, scheduling, command, telemetry processing, and science analysis. The MMOC's ready-to-use services reduce start-up time, shorten procurement and provisioning and allow mission planning to focus more on science and less on infrastructure.

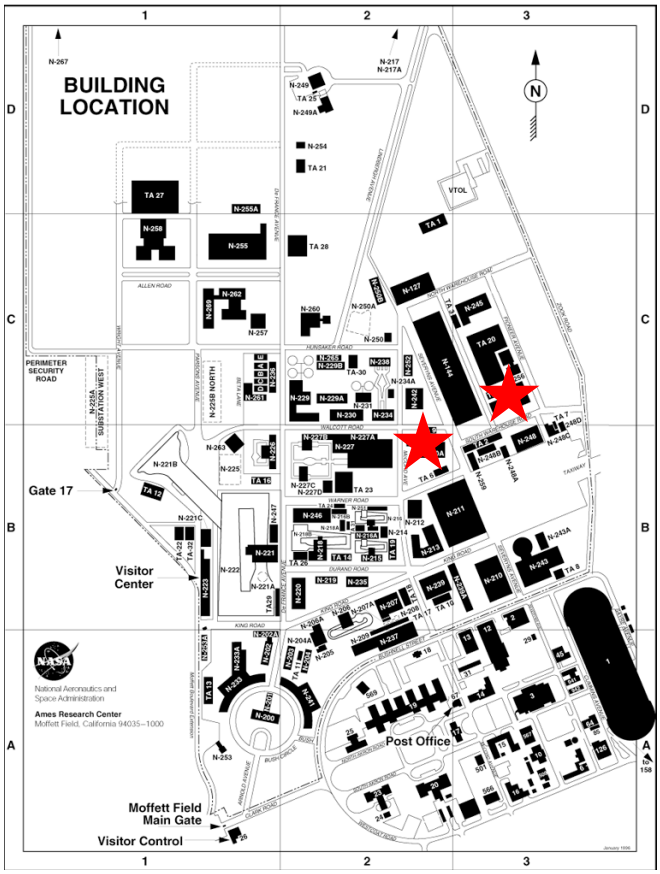
Capabilities

The MMOC is designed to be a low-cost, general purpose, highly flexible and configurable resource for multiple simultaneous spaceflight missions operating at Ames. It deploys high-performance capabilities in an extensible and adjustable environment so that missions can reap the advantages of using common general services along with support for unique requirements.

Facilities: The MMOC has mission operations facilities in two buildings at Ames, N-240 and N-244, an arrangement that provides geographic diversity and resiliency in the event of a facility disaster. The MMOC facilities and data systems are FISMA-compliant and were granted renewed authority to operate in October 2015. The facilities include two general-purpose Mission Operations Centers, the Kepler Science Operations Center, and the SOFIA Science Center. The current capacity of the MMOC ranges up to four simultaneous missions, depending on mission size and complexity. Resources exist to support future expansion.



The MMOC facilities are located in Buildings N-240 and N-244



Network: The MMOC hosts mission computing equipment on the Ames Mission Network (AMN). Designed and built in 2011, the AMN is dedicated solely to mission traffic. Key benefits of the AMN include the ability to tailor network security to each mission's requirements, isolation of mission traffic from general administrative traffic, and provision of a centrally managed network service. The AMN has a 10-Gbps interface, utilizes redundant equipment and connections, and diversely routes traffic across the Ames campus. The AMN peers with NASA's restricted IONet and CSO PIP/SIP networks, enabling secure connectivity to the other NASA centers and ground stations on the Near Earth and Deep Space networks.

Voice System: Missions using the MMOC can make use of a top-of-the line mission voice system manufactured by Frequentis USA and provided by the NASA Mission Operations Voice Enhancement (MOVE) project. MOVE systems are the standard for mission voice at NASA and through acquisition of its own system, the Ames MMOC can seamlessly establish conferences with participants at all other NASA flight centers and ground stations. The ARC MOVE system can accommodate up to 100 voice stations and 150 conferences.

IT Hardware and Software: The MMOC deploys and administers a wide range of workstations and servers, from windows and Linux machines to multi-terabyte high-end computing Unix servers. The MMOC will accommodate any command and telemetry handling software required by a mission, and has successfully supported ASIST, ITOS, OASIS, TREK and InControl.

Services: The MMOC provides comprehensive system administration, system and data security, database administration, network engineering, software and system design support.

Staff:
The MMOC staff consists of the MMOC director and eight mission support engineers.

Recent Customers:
LCROSS, Space Shuttle, Kepler, SOFIA, IRIS, LADEE, and ISS Payloads (EMCS, SPHERES, Rodent Habitat, Human Exploration Telerobotics, BioCulture System, Fruit Fly Lab)

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